



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/559,799 | 12/08/2005 | Tomonari Nakayama | 03500.101486. | 8177 |
| 5514 7590 04/01/2008 FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112 | | | | |
| EXAMINER | | | | |
| JAHAN, BILKIS | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 2814 | | | | |
| MAIL DATE | | DELIVERY MODE | | |
| 04/01/2008 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/559,799

Applicant(s)

NAKAYAMA ET AL.

Examiner

BILKIS JAHAN

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 5/23/07, 3/15/07, 12/01/06, 11/06/06

DETAILED ACTION

Claim Rejections - 35 USC § 103

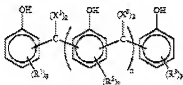
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernds et al (US 2004/0026689 A1).

Regarding claim 1, Bernds et al disclose field effect transistor (Fig. 7) comprising at least a substrate 19 (Fig. 7, Para.42, line 5), an organic semiconductor layer 22 (Fig. 7, Para.42, line 20), an insulating layer 21 (Fig. 7, Para.32, lines 8-11), and a conductive layer 20 (Fig. 7, Para.42, line 6),

- Bernds et al do not disclose the insulating layer comprises a cured product of a phenol resin represented by a following general formula (I):



(wherein, R1, R2 and R3 are each independently at least one selected from the group consisting of hydrogen atom, halogen atom, hydroxymethyl group, alkyl group having 1 to 12 carbon atoms, alkenyl group, alkynyl group, alkoxy group, alkylthio group, and alkyl ester group, XI and X2 are each independently at least

one selected from the group consisting of hydrogen atom, alkyl group having 1 to carbon atoms, alkenyl group, alkynyl group, and aryl group, and n is an integer of 0 to 2,000.). However, when the semiconductor compound recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 195 USPQ 430, 433 (CCPA 1977).

Regarding claim 2, Bernds et al further disclose the field effect transistor the conductive layer comprises a gate electrode 20 (Fig. 7, Para.42, line 6), a source electrode 20 (Fig. 7, Para.42, line 17), and a drain electrode 20 (Fig. 7, Para.42, line 17), the insulating layer 21 (Fig. 7, Para.32, lines 8-11) includes a gate insulating layer (Fig. 7), and the gate insulating layer is a cured product of a phenol resin represented by the above general formula (I) (Fig. 7, Para.32, lines 8-11).

Regarding claim 3, Bernds et al do not disclose the field effect transistor, wherein the thickness of the gate insulating layer is 100 nm to 1 μ m. However, it would have been obvious to one of ordinary skill in the art to **use any suitable thickness for the device**, because it has been held that where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable range

Art Unit: 2814

by routine experimentation. See *In re Alner*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bernds et al (US 2004/0026689 A1) in view of Tsutsui (US 7,239,081 B2).

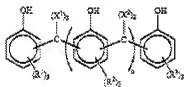
Regarding claim 4, Bernds et al disclose limitations in claim 1 but do not disclose the field effect transistor wherein part or all of the conductive layer comprises an agglomerate of conductive fine particles.

- However, Tsutsui discloses part or all of the conductive layer comprises an agglomerate of conductive fine particles 104 (Tsutsui, col.5, lines 39-40). Tsutsui teaches conductive particles in the film are used for high conductivity (col. 2, lines 38-41). It would have been obvious to one having ordinary skill of the art at the time of invention to replace Bernds's conductive film with Tsutsui's conductive film for high conductivity (col. 2, lines 38-41).
- Bernds et al do not disclose a primary particle diameter of 5 nm to 2 micrometer. However, it would have been obvious to one of ordinary skill in the art to **use any suitable diameter for the device**, because it has been held that where the general conditions of the claims are disclosed in the prior art, it is not inventive to discover the optimum or workable range by routine experimentation. See *In re Alner*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955).

Claims 5, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernds et al (US 2004/0026689 A1) in view of Henshaw et al (3857817).

Regarding claim 5, Bernds et al disclose a process for producing a field effect transistor (Fig. 7) comprising a substrate 19 (Fig. 7, Para.42, line 5), an organic semiconductor layer 22 (Fig. 7, Para.42, line 20), an insulating layer 21 (Fig. 7, Para.32, lines 8-11), and a conductive layer 20 (Fig. 7, Para.42, line 6).

- Bernds et al do not disclose coating a thermosetting resin. However, Henshaw et al show the usage of hexamethoxymethyl as a thermosetting coating (abstract). It would have been obvious to one having ordinary skill of art at the time of invention to add Bernds's process with Henshaw's usage.
- However, Bernds et al do not disclose a thermosetting resin the insulating layer composition containing at least a phenol resin represented by the following general formula (I):



(wherein, R₁, R₂ and R₃ are each independently at least one selected from the group consisting of hydrogen atom, halogen atom, hydroxymethyl group, alkyl group having 1 to 12 carbon atoms, alkenyl group, alkynyl group, alkoxy group, alkylthio group, and alkyl ester group, X₁ and X₂ are each independently at least one selected from the group consisting of hydrogen atom, alkyl group having 1 to

carbon atoms, alkenyl group, alkynyl group, and aryl group, and n is an integer of 0 to 2,000.) and heating it to form the insulating layer. However, when the semiconductor compound recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 195 USPQ 430, 433 (CCPA 1977).

Regarding claim 7, Bernds et al disclose limitations in claim 5 but do not disclose process for producing a field effect transistor, wherein the softening point of the phenol resin contained in the thermosetting resin composition is in the range of 70 to 130°C.

- However, Henshaw et al disclose the softening point of the phenol resin contained in the thermosetting resin composition is in the range of 70 to 130°C (column 3, lines 58-60). Henshaw teaches thermosetting resin composition is in the range of 70 to 130°C is used for achieving excellent hardness, toughness and durability of the film (col.1, line 15). It would have been obvious to one having ordinary skill of the art at the time of invention to replace Bernds's process temperature with Henshaw's process temperature for achieving excellent hardness, toughness and durability of the film (col.1, line 15).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bernds et al (US 2004/0026689 A1), Henshaw et al (3857817) and further in view of Hirai (US 2004/0129937 A1).

Regarding claim 6, Bernds et al disclose limitations in claim 5 but do not disclose process for producing a field effect transistor, wherein part or all of the conductive layer is formed by applying a solution, dispersion, or paste of a conductive material or a precursor of the Conductive material and heating it.

- However, Hirai discloses part or all of the conductive layer is formed by applying a solution, dispersion, or paste of a conductive material (Para. 77, 78) or a precursor of the Conductive material and heating it. Hirai teaches using wet process to increase productivity and reducing cost (Para. 5). It would have been obvious to one having ordinary skill of the art at the time of invention to replace Bernds's process with Hirai's process to increase productivity and reducing cost (Para. 5).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BILKIS JAHAN whose telephone number is (571)270-5022. The examiner can normally be reached on M-F, 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571)-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wai-Sing Louie/
Primary Examiner, Art Unit 2814

BJ